Electrochemical immunosensors for sensitive determination of emerging autoimmune disease biomarkers

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Abstract

Rheumatoid arthritis is an autoimmune disorder characterized by persistent erosive synovitis, systemic inflammation and the presence of autoantibodies, particularly rheumatoid factor (RF) and anti-cyclic citrullinated peptide (CCPA) antibodies, which play an important role in inducing inflammation and joint damage, releasing pro-inflammatory cytokines from monocytes and macrophages [1,2]. Likewise, neutrophil activating protein-2 (CXCL7) is a platelet-derived growth factor belonging to the CXC chemokine subfamily, which is expressed in serum, synovial fluid and synovial tissue of patients developing rheumatoid arthritis during the first twelve weeks, being useful to reflect local pathological changes [3]. Besides, matrix metalloproteinase-3 (MMP-3), which is induced by inflammatory cytokines such as interleukin-1 (IL-1) and tumor necrosis factor alpha (TNF-α) in rheumatoid synovium, degrades several extracellular matrix components of cartilage and plays central roles in rheumatoid joint destruction [4]. Thereby, monitoring serum RF, CCPA, CXCL7 and MMP-3 levels is useful for predicting the disease activity in rheumatoid arthritis.

In this work, the construction and analytical performance of two dual electrochemical platforms for the simultaneous determination of CCPA/RF and CXCL7/MMP-3 are described. After the optimization of experimental variables involved in the preparation and performance of the biosensors, the analytical usefulness of the developed configurations was demonstrated by its application to the determination of these biomarkers in serum samples, providing good results.

Biography:

Araceli González-Cortés obtained her PhD in Chemistry from University Complutense of Madrid in 1994. Since 2002, she works as Associate Professor in the Analytical Chemistry Department of the Faculty of Chemical Sciences at the University Complutense of Madrid. She collaborates in the "Electroanalysis and Electrochemical (Bio)sensors" research group. Her scientific and research interests lie in electrochemical sensors and biosensors and their applications to clinical analysis. She has published more than 75 papers in repute journals and is a reviewer for several international journals..